Alcohol Distribution, Alcohol Retailing and Social Responsibility

A Report Submitted to the Beverage Alcohol System Review Panel by:

Robert E. Mann[1,2], Jürgen T. Rehm[1,2,3], Norman Giesbrecht[1], Robin Room[4], Edward Adlaf[1,2], Gerhard Gmel[3], Kate Graham[5], Esa Österberg[6], Reginald Smart[1] and Michael Roerecke[1]

1 Centre for Addiction and Mental Health, Toronto, Ontario
2 Department of Public Health Sciences, Faculty of Medicine, University of Toronto
3 Swiss Institute for the Prevention of Alcohol Problems
4 SORAD – Centre for Social Research on Alcohol and Drugs, Stockholm University
5 Centre for Addiction and Mental Health, London, Ontario
6 National Research and Development Centre for Welfare and Health, Helsinki

Prepared with the assistance of Christine Smillie-Adjwarka, Lise Anglin, Dan Chisholm, Ben Taylor, and Jinhui Zhao

105-07146/

TABLE OF CONTENTS

1. **Introduction** 3
   - Alcohol Use in Ontario 3
   - Alcohol-related Harm 4
   - Drinking-driving, Aggression and Violence 5
   - Hospital Days and Deaths Resulting from Alcohol Use 5

2. **The Relationship Between Alcohol Consumption and Problems: Alcohol Consumption as an Indicator of Social Responsibility** 6
   - Per capita consumption and drinking driving fatalities 6
   - Per capita consumption and fatalities from other causes 7

3. **The Impact of Changes in Alcohol Distribution and Retailing Practices** 8
   - Outlet Density 8
   - Price 9
   - Private Versus Public Control of Retail Outlets 10
   - Regulation and Enforcement 12

4. **Concluding Comments: Monitoring the Effects of Policy Change** 13

5. **References** 14

1. Introduction

Alcohol is an accepted part of modern society. In Ontario, the majority of adults consume alcohol, and the production and distribution of alcohol creates thousands of jobs in Canada. In addition, governments derive significant tax revenues from alcohol production and sales. Moderate use of alcohol may also confer health benefits on some users, primarily from the protective effects of regular and moderate drinking on some forms of heart disease (Rehm et al., 2003; Ashley et al., 2000). Given the distribution of these chronic diseases in the population, the cardio-protective effects apply mainly to adults aged 45 and older (Rehm et al., 1995a,b).

However, these benefits, at the individual level, must be viewed in the context of the health and social problems (or harms) that result from immoderate consumption (Edwards et al., 1994; Goldstein and Kalant, 1990). Alcohol creates numerous harms for society, and a key goal of government policies on alcohol over the years has been to achieve a balance of the benefits and harms of alcohol. This report is a summary version of a longer document that reviewed the research addressing the effects of different forms of alcohol distribution and retailing on alcohol consumption and problems (Mann et al., 2005). Social responsibility in this context refers to those practices or policies that are associated with reduced harms or problems. The present report outlines the use of alcohol and the problems resulting from alcohol in Ontario, identifies problems and indicators of problems, and identifies methods and principles of alcohol retailing that are relevant for social responsibility, that is, they are associated with lower or higher levels of alcohol problems.

Alcohol Use in Ontario

Alcohol is widely used in Ontario. As can be seen in Figure 1, according to the Canadian Addictions Survey (Adlaf, Begin and Sawka, 2005), 78.7% of Ontario adults report consumption of alcohol at least once in the previous year. In comparison to other provinces, Ontario residents fell in the middle. Residents of Quebec and Alberta reported the highest proportion of current consumers (82.3% and 79.5%, respectively), while residents of Prince Edward Island and New Brunswick reported the lowest proportion of consumers (70.2% and 73.8% respectively). Similarly, residents of Ontario fell in the middle of the range of harms reported in the past 12 months. An average of 9.1% of Ontarians reported experiencing harm related to their own drinking, and 31.8% reported experiencing harms resulting from someone else's drinking. The province with the highest level of harms reported was Alberta, with 9.5% reporting harms from their own drinking, and 38.0% reporting experiencing harms from others' drinking. The province with the lowest level of harms reported was Newfoundland, with 7.2% of adults reporting harms resulting from their own use, and 29.7% reporting harms resulting from the use of alcohol by others, in the past year.

[Insert Figure 1 about here]

Figure 2 presents recent data on the use of alcohol among students in grades 7 through 12 (Adlaf and Paglia, 2003), and among adults aged 18-29 (young adults), 40-49 (the middle-aged) and 65 and over (seniors) (Adlaf and Ialomiteanu, 2002). Among young people use of alcohol increases with age, from 39.1% of grade 7 students to 82.5% of grade 12 students. Among adults, alcohol use declines with age, from 84.9% in young adults to 67.0% among seniors.

[Insert Figure 2 about here]

Figures 3 and 4 present data since 1977 on the proportion of the adult population (age 18 and above) who report drinking alcohol, and who report recent heavy drinking (binge) occasions (drinking 5 or more drinks) at least once in the previous week (Adlaf and Ialomiteanu, 2002). Among adults, the proportion reporting use of alcohol has been relatively consistent, with minor variations (Figure 4). Recent heavy or binge use (Figure 5) is one of several indicators of hazardous drinking patterns, and reflects heavy episodic consumption of alcohol that is associated with substantially increased risk of motor vehicle collisions as well as injuries associated with falls and other accidents (see Mann et al., 2005). About one person in 10 reports this hazardous drinking pattern, and the proportion seems to be increasing in recent years. Some subgroups of the population, such as university students, are more likely than other population groups to report hazardous patterns of alcohol consumption (Gliksman et al., 2000).

[Insert Figure 3 about here]

[Insert Figure 4 about here]

Alcohol-related Harm

Most individuals who consume alcohol do so without creating problems for themselves or others. However, it is also the case that occasional heavy use of alcohol, or continued use at levels or under circumstances that increase health risk, is reported by a substantial minority of Ontario residents. In 2001, 12.3% reported consuming 5 or more drinks on at least one occasion in the past week. As well, 13.3% of Ontario adults (16.7 % of drinkers) reported hazardous or harmful drinking as measured by the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993), and 10.9% of drinkers with a valid drivers license reported driving within one hour of consuming two or more drinks in the past 12 months (Adlaf and Ialomiteanu, 2002).

There is evidence that the cumulative damage from alcohol-related harm is extensive, involving a number of diseases, medical conditions and ailments, and is not likely to decrease (Rehm et al., 2003a). The list of ailments linked with alcohol is extensive. A recent World Health Organization (WHO)-affiliated study indicated that alcohol use was associated with over 60 conditions (Rehm et al., 2003b; Room, Babor and Rehm, 2005). International evidence has indicated that damage from alcohol is about equal to that from tobacco and greater than other risk factors, and among some populations, such as youth or young adults, the damage resulting from alcohol is even greater than from tobacco. The estimated disability, disease and death from alcohol is about 4.0 % of total disability adjusted life years (DALYs), and within alcohol-related DALYs, about 47% is from acute or traumatic events and the rest associated with chronic conditions (Room, Babor and Rehm, 2005, Table 3). Alcohol is an important contributor to mortality from chronic diseases such as liver cirrhosis and cancer (Mann, Smart and Govoni, 2003; Room, Babor and Rehm, 2005). In total, alcohol results in a very large burden on the health care system. The World Health Organization has estimated that, in 2000, in developed countries like Canada, alcohol is the third largest contributor to the burden of illness (WHO, 2002). At 9.2%, it is close to that accounted for by the leading contributors, tobacco (12.2%) and high blood pressure (10.9%). These calculations do not include the large number of social and

familial disruptions associated with alcohol use and thus represent an underestimate of alcohol-related harms overall.

Drinking-driving, Aggression and Violence

Alcohol is the largest single contributor to motor vehicle fatalities, and drinking driving accounts for the largest number of criminal deaths (e.g., Wilson and Mann, 1990). In recent years, alcohol has been found in about 35% of fatally injured drivers, and is a cause of a much larger number of injuries and collisions. Many police and justice system resources are devoted to apprehending and prosecuting drunk drivers, and drunk driving remains the largest criminal cause of death in Canada.

Excessive use of alcohol creates substantial problems in families and in the workplace, which frequently involve aggression and violence, and alcohol and other drug abuse contributes about 10 to 20 percent of lost productivity in the workplace (Addiction Research Foundation, 1996). A general population survey of Ontario adults which asked about the most recent incident of physical aggression during the past 12 months found that in over 50% of incidents either the respondent, the main opponent or both had been drinking (Wells and Graham, 2003) and that 30% of incidents occurred in or around licensed premises (Graham, Wells and Jelley, 2002). Incidents involving alcohol or occurring in licensed premises were more likely than other incidents to involve males and younger adults. About 44% of incidents reported by males aged 18-24 and 60% of those reported by males aged 35-34 occurred in licensed premises.

The association between alcohol consumption and violence is well known, and experimental research indicates that alcohol intoxication plays a causal contributing role in aggression (Bushman, 1997). Pernanen et al. (2002) concluded that over 40% of violent crimes in Canada were attributable to alcohol. Aggression is related to both overall consumption and frequency of intoxication (Dawson, 1997; Rossow, 2000; Wells, Graham and West, 2000) and heavy drinkers are more likely to be both perpetrators and victims of violence (Room and Rossow, 2001; Rossow, Pernanen and Rehm, 2001). A number of studies have demonstrated a link between per capita consumption and violence, with this link stronger in cultures where drinking to intoxication is a common pattern (Lenke, 1990; Norström, 1993, 1998; Parker and Cartmill, 1998; Rossow, 2001). Emergency room studies have also found that violence-related injuries are associated with greater intoxication levels than accidental injuries (Macdonald et al., 2005). This relationship taken together with the higher rates of aggression and violence among younger versus older adults suggests that any policy changes that increase consumption, particularly heavy drinking occasions among young adults will result in increased rates of alcohol-related violence.

Hospital Days and Deaths Resulting from Alcohol Use

Table 1 presents the numbers of hospital days and deaths associated with alcohol use in Ontario in 1992[1]. It is clear that excessive alcohol use creates a very large number of health problems in

[1] The best estimates for the impact of alcohol-related harm on the health care system in Ontario are based on 1992 data (Xie et al, 1996). These estimates may underestimate harms since current data on alcohol consumption suggest

the province. A total of 2392 deaths were identified as involving alcohol. The largest single source of these deaths was from Motor Vehicle Traffic Accidents (468). Alcohol also played an important role in deaths from other accidental and violent causes, including deaths from falls, suicide, assault and fires. The second largest source of alcohol-related deaths was from alcoholic liver cirrhosis (436), a consequence of chronic heavy consumption of alcohol. Other major causes of alcohol-related deaths included Alcohol Dependence Syndrome and various forms of cancer (e.g., oesophageal cancer and liver cancer). The largest numbers of hospital days from an alcohol-related cause were associated with Alcoholic Psychoses, Alcohol Dependence Syndrome, Motor Vehicle Traffic Accidents, Alcoholic Liver Cirrhosis and Stroke. Xie et al. (1996) estimated that health care costs associated with alcohol were $441, 832,000. Total costs attributable to alcohol in Ontario include lost productivity, research, prevention, treatment, administrative costs, law enforcement, damage, as well as indirect costs resulting from morbidity and premature mortality and other costs and sum up to $2,857,506,000.

SUMMARY: Most Ontarians consume alcohol without harm. However, research demonstrates that alcohol use is major factor in social and health problems in Ontario. Alcohol is a leading contributor to violence, domestic abuse, crime and lost productivity. The health burden from immoderate alcohol use is similarly large.

[Insert Table 1 about here]

2. The Relationship Between Alcohol Consumption and Problems: Alcohol Consumption as an Indicator of Social Responsibility

The impact of some potential changes in alcohol distribution and retailing practices, such as a change in the legal drinking age, on specific alcohol-related problems such as drinking driving is well documented. However, the impact of many other types of changes in distribution and retailing practices on specific harms like drinking driving is less well researched. There is, though, a larger body of evidence on the effects of changes in distribution and retailing practices on average, or per capita, alcohol consumption levels. As well, extensive research is available on the impact of per capita consumption levels on a large number of alcohol related harms. This research demonstrates that per capita consumption of alcohol is an excellent indicator of the level of problems or harms created by immoderate use of alcohol.

Per capita consumption and drinking driving fatalities

Earlier reviews of this literature (Bruun et al, 1975; Mann and Anglin, 1990) concluded that there is a strong relationship between per capita consumption and mortality rates from alcoholic liver disease, alcohol-related collisions, and other alcohol related problems. Recent studies using Canadian data have provided confirmation of the relationship between per capita consumption and drinking-driving fatalities. Skog (2003) found that a one-litre increase in per capita consumption of alcohol was associated with an increase of 3.61 in the male motor vehicle

---

that consumption has remained fairly level and heavy episodic consumption has actually increased (See Figures 4 and 5).

collision (MVC) mortality rate (per 100,000 population). Asbridge et al. (2004), using data from Ontario (1962-1996), found that a one-litre increase in per capita consumption of alcohol was associated with an increase in drinking driver fatality rate of between 8% and 14%, depending on which factors were controlled for. In the same period, Mann et al. (submitted) found an increase of 23% in the drinking driver fatality rate resulting from a one-litre increase in beer consumption per capita, but not for other forms of alcohol. Research conducted in other countries has found similar relationships between increased consumption and drinking driving. A significant association has been observed between per capita consumption of alcohol and total traffic fatalities and alcohol-related traffic fatalities in the United States (Mann, Smart and Anglin, 1996; Gruenewald and Ponicki, 1995; Zlatoper, 1991; Noland, 2003)) and southern Europe (Skog, 2001).

Per capita consumption and fatalities from other causes

Other recent Canadian and European studies (since 2000) examining the impact of per capita alcohol consumption on various measures of alcohol-related deaths, employing sophisticated time series and econometric methods in which the effects of various confounding factors can be controlled (Xie, Mann and Smart, 2000; Ramstedt, 2004b; Ramstedt, 2003; Skog, 2003; Asbridge et al., 2004; Rossow, 2004; Norström, 2004), have confirmed this relationship. Xie, Mann and Smart (2000) examined factors affecting alcohol consumption and liver cirrhosis mortality in Canadian provinces between 1968 and 1986. They found an association between alcohol outlets, alcohol consumption and alcohol-related liver cirrhosis mortality. A 1% increase in the rate of retail alcohol outlets resulted in an increase of about 1% in the chance of the average person dying of cirrhosis, through its effect on alcohol consumption levels. In addition, they observed a relationship between alcohol price and consumption, such that a 10% increase in price would reduce consumption by about 1%. European and Canadian studies have found strong associations between population level drinking rates and death rates from all causes (Norström, 2001, 2004), from acute events (Ramstedt, in press; Rossow, 2001, 2004; Skog, 2003) and from chronic disease conditions associated with alcohol (e.g., Ramstedt, 2002, 2003, 2004b). Canadian studies have demonstrated a positive association between population level drinking rates and mortality from all causes (Norström, 2004), liver cirrhosis (Ramstedt, 2003), alcohol-related mortality (Ramstedt, 2004b), violent deaths (Rossow, 2004), and suicides (Ramstedt, in press).

A main conclusion from this research is that if there is more drinking in a population, the risks of serious consequences are likely to increase. Therefore, public health and safety policies that regulate accessibility to alcohol have beneficial implications for people with a wide range of drinking experiences and practices. The recent Canadian studies demonstrating a strong link between per capita consumption of alcohol and deaths from various alcohol-related causes are summarized in Table 2. Collectively, these results indicate that anything that acts to increase per capita consumption can be expected to increase alcohol-related harms, while anything that acts to decrease per capita consumption can be expected to decrease alcohol-related harms.

[Insert Table 2 about here]

SUMMARY: Research demonstrates that average, or per capita, consumption of alcohol is significantly associated with alcohol-related fatality rates. Alcohol distribution and retailing practices that act to increase average alcohol consumption will act to increase alcohol related fatality rates, while practices that act to reduce average alcohol consumption will act to reduce alcohol related fatality rates.

3. The Impact of Changes in Alcohol Distribution and Retailing Practices

In Canada, governments have traditionally acted to regulate products that present a significant hazard for the public. Since the repeal of prohibition, governments in Ontario and elsewhere in North America have regulated the retail distribution of alcohol. Initially, regulations were very restrictive (see Single, Giesbrecht and Eakins, 1981). However, over the years, regulations in almost all jurisdictions have become increasingly less restrictive. Significant regulatory changes have included introduction of Sunday sales, extensions of hours of sale, and reduction of the legal drinking age among others. These changes have often been evaluated, and thus there is now a substantial body of evidence that can shed light on the likely effect of changes in alcohol regulations on alcohol consumption and problems. The following sections describe the likely impact of various types of changes in alcohol distribution and retailing practices on alcohol consumption and problems. The specific changes considered are changes in outlet density, price of alcohol (including taxation), the mix of private versus public control of retail outlets, and regulation and enforcement practices.

Outlet Density

Outlet density refers to the number of outlets available for the retail purchase of alcohol. Several American studies have looked at the association of outlet density with rates of drinking driving collisions. Four studies report no impact of outlet density on drinking-driving or collision measures (Gruenewald and Ponicki, 1995; Kelleher et al., 1996; Meliker et al., 2004; Lapham et al., 2004). However, a larger number of studies (eight) have reported a significant impact of outlet density on alcohol consumption and drinking driving collision (Scribner, MacKinnon and Dwyer, 1994; Gruenewald et al., 1996; Gruenewald et al., 1999; Gruenewald, Johnson and Treno, 2002; LaScala et al., 2001; Treno, Grube and Martin, 2003; Escobedo and Ortiz, 2002; Cohen, Mason and Scribner., 2002). On balance, the research indicates that increasing numbers of outlets will increase alcohol-related collisions and fatalities (see Mann et al., 2005 for a more detailed description).

Research has examined the associations between outlet density and measures of student and underage drinking. Outlet density has been found to be closely related to heavy drinking and drinking related problems among college students (Weitzman et al., 2003); other associations were found for the number of commercial sources of alcohol and binge drinking and drinking in inappropriate places for students age 16 to 17 (Dent et al., 2005).

Over the years, the effects of changes in outlet density have been studied. In some instances variations in effects have been reported. The most widely known example has been the changes in wine sales that occurred with the end of the state wine monopoly in Iowa. Over a period of

several years, two research groups debated the impact of these changes, with one claiming little or no effects on consumption and the other claiming important effects on consumption (cf. Mulford, Ledolter and Fitzgerald, 1992; Wagenaar and Holder, 1991). This debate has been in part resolved by subsequent observations in other jurisdictions demonstrating that the increases in outlets that result from a move from a public to a privately controlled retailing system have resulted in increases in consumption (e.g., Wagenaar and Holder, 1995; see Mann et al., 2005 for a more detailed description of these studies).

In sum, these studies, which control for potential confounders in a limited way, demonstrate significant associations of outlet density with alcohol consumption and alcohol-related problems (for a discussion on analysis issues in the field of alcohol consumption and availability see Mann et al., 2005). Outlet density is in general positively associated with alcohol consumption and alcohol related problems: the higher the density, the higher consumption and problems will likely be.[2]

SUMMARY: Increased alcohol outlets will act to increase alcohol consumption, and associated alcohol related problems such as underage consumption, drinking and driving, and alcohol-related aggression, morbidity and mortality.

Price

A substantial amount of research finds that the price of alcohol, or the amount of tax charged, is a powerful determinant of alcohol consumption and alcohol problems (Seeley, 1960; Bruun et al., 1975; Mann and Anglin, 1990; Edwards et al., 1994; Babor et al., 2003). The initial finding in this area was reported by Seeley (1960) employing data on alcohol price, alcohol consumption and mortality rates from cirrhosis of the liver in Ontario and Canada. He observed that the correlation between the price of alcohol and per capita consumption was -.96 for Ontario and -.99 for Canada. Similarly, the correlation between the price of alcohol and the mortality rate for liver cirrhosis was -.90 for Ontario and -.88 for Canada. Thus, as price increased, alcohol consumption and cirrhosis mortality rates decreased.

Many subsequent studies in Canada and internationally have replicated this relationship between price of alcohol, or taxation rates, and consumption and problem rates. For example, Adrian, Ferguson and Her (2001) found that increases in prices of alcohol were associated with decreases in alcohol-related motor vehicle collision rates and alcohol-related criminal traffic offenses in Ontario. In the United States, excise tax rates on beer have been found to be negatively associated with alcohol-related driver fatality rates (Chaloupka, Saffer and Grossman, 1993).

A number of the reviews of the research on the effectiveness of alcohol policies have concluded that alcohol taxes are among the most effective problem-prevention tools available (e.g., Chaloupka, Saffer and Grossman, 1993; Babor et al., 2003; Room, Babor and Rehm, 2005). Increases in taxes will act to reduce alcohol problem rates and associated burden on police and

[2] Changes in outlet densities have larger effects when density is low compared to when it is high. Changes in beverage specific outlet densities are less likely to increase consumption, if alcohol is already widely available.

health care systems. Increased taxation on alcohol has the added benefit of providing additional government revenue. Moreover, factors that affect alcohol availability such as price are known to influence consumption even among those who are heavy drinkers and may be experiencing alcohol problems such as abuse and dependence; in fact, price and other availability factors may even exert a larger impact on these groups than on the general population (e.g., Mäkelä, Rossow and Tryggvesson, 2002; Mann et al., 2001).

SUMMARY: Research conducted in Canada and internationally shows there is a strong link between the real cost[3] of alcohol and its consumption, and thus with the problems resulting from alcohol. The evidence demonstrates that increases in the cost of alcohol to the consumer will act to decrease consumption rates, particularly among heavy consumers, and thus to decrease alcohol-related problem rates. Conversely, a decrease in the cost of alcohol to the consumer will act to increase consumption rates, and thus to increase alcohol-related problem rates.

Private Versus Public Control of Retail Outlets

While many Western jurisdictions had publicly controlled alcohol retail systems, in the latter part of the 20th century some jurisdictions have moved away from public control of outlets to privately controlled systems. Other jurisdictions, like Ontario, have a hybrid system in which there is a mix of public and private control. Studies of privatisation of sales of alcoholic beverages in the United States show substantial variations in increases in consumption, with increases observed ranging between 13 and 150% (Wagenaar and Holder, 1995). An overview of privatisation effects including changes in outlet densities and consumption changes can be found in Her et al. (1999). Based on Her et al. (1999), the general relationship between volume of drinking and outlet density is summarized in Figure 5 (see Mann et al., 2005 for a more detailed description of the methodology). American, European and limited Canadian data suggest that increasing private ownership of alcohol retail outlets will act to increase the number of outlets, with resulting effects on alcohol consumption as suggested by Figure 5.

[Insert Figure 5 about here]

Canadian experience with moving from public to private control of retail outlets has occurred in Alberta and Quebec (British Columbia considered and rejected moving to a system similar to Alberta's). In both jurisdictions the numbers of alcohol outlets increased substantially. In Quebec, some divergence in evidence on consumption changes has been seen, but the most recent analyses find evidence for modest but significant increases in some forms of consumption (Trolldal, 2005). In Alberta, evidence has been found for modest increases in consumption, particularly at a time when consumption was decreasing in other parts of the country (Flanaghan, 2003; Trolldal, in press). As well, government tax levels have been reduced several times since demonopolization of retail outlets, due to pressure from the alcohol retailers (Flanaghan, 2003). In Ontario, as noted a hybrid system exists. Beer has been given a preferential tax/price

[3] Controlling for consumer price index or cost of other goods and services.

treatment in the province that is likely an important factor in beer's disproportionately large contribution to drinking driving deaths (Mann et al., submitted).

There is evidence that privatisation in Alberta has been associated with an increase in criminal offences, such as liquor store break-ins and more relaxed enforcement of laws pertaining to underage purchases (Laxer et al., 1994). Furthermore, within Canada, Alberta continues to have some of the highest rates of alcohol-related problems, such as drunk driving fatalities (Mayhew, Brown and Simpson, 2002). However, to date, relatively little analysis of drinking-related damage has been conducted related to privatisation in Quebec and Alberta.[4]

In Ontario's hybrid system, about 14% of underage high school students report purchasing alcohol illegally (Smart et al., 1996). The reported proportion of underage drinkers purchasing alcohol is much higher in areas with more completely privately controlled retail alcohol systems. For example, in the United Kingdom, 56% of underage drinkers purchased alcohol (Willner and Hart, 2001) with about 49% in Scotland (Bradshaw, 2003) and about 30% in Oregon (Dent et al., 2005). A change from a monopoly to a privately controlled system has been found to increase availability of alcohol to minors in Finland (Babor et al., 2003), and "minor-licensed premises" (176%), "minor-obtain liquor" (111%), and "supply to minors" (83%) offenses in Alberta (West, 2003). Similar experiences were observed in Sweden (see Mann et al., 2005 for details).

In Alberta's privatized system, all licensees are required to ask for proof of age when anyone who appears to be under 25 years of age attempts to purchase liquor. In 2002, following notification of all licensees of their requirement to request proof of age, the Alberta Gaming and Liquor Commission (AGLC) conducted an audit involving 662 licensed premises, including liquor stores (AGLC, 2002). In this audit they found that 77% of licensed establishments did not request ID from patrons who appeared to be under the age of 25. Liquor stores had the highest rates of failure to request ID (82%). In subsequent years, following intensive education, training and enforcement efforts with licensed establishments, improvements in request rates were observed in targeted establishments with a reduction to 17% in the proportion of establishments that failed to request ID (AGLC, 2004). General Merchandise Liquor Stores had the highest rate of failure to request ID (36%).

Her and colleagues (Her et al., 1998) estimated alcohol consumption to increase between +10% and +20% if Ontario moved to a completely privately controlled retail system. Table 3 shows the estimated increases in alcohol mortality associated with increase in consumption of 10% and 20%. As shown in this table, a change of 10% would result in about a 13% change of mortality burden, and a change of 20% in about a 26% change in mortality burden. If we apply these changes to the social costs, such as productivity losses, law enforcement, direct and indirect health care costs, and others, of alcohol in Ontario, we would expect an increase in social costs for 2001 of about 11% or $367 million (Rehm, 2005; social cost estimate based on Single et al., 1998). In sum, under conservative assumptions, a change in Ontario to a fully privately controlled alcohol distribution system would be expected to result in a minimum increase in consumption, burden of mortality and social costs of 10%.

---

[4] In their review of the privatisation literature on alcohol sales, Her et al (1999) noted that "there is relatively little evidence on the effects of demonopolization, or privatisation, directly on alcohol-related harms." (p. 1135) since the topic of harm was not a common focus of these studies.

SUMMARY: Research on public versus private control of retail outlets suggests that under privately controlled retail distribution systems, larger numbers of outlets are found and higher levels of consumption are seen, including underage consumption. These higher levels of consumption are expected to increase alcohol problem rates.

[Insert Table 3 about here]

Regulation and Enforcement

Regulation and enforcement have been measures traditionally used to address alcohol problems. A well-known example is in the area of impaired driving. Over the years, a variety of legal and enforcement initiatives have been developed to reduce this problem. Evaluations of these measures suggest that some, such as the introduction and reduction of legal alcohol limits for driving, and enforcement programs like Ontario's RIDE program, have shown that they can exert beneficial effects (Babor et al, 2003; Mann et al, 2001).

Similar evidence exists to support the use of regulation and enforcement practices to control alcohol problems in the retail sale of alcohol. As discussed above, in Alberta increased enforcement of regulations requiring ID checks for individuals who appear to be under 25 was associated with an increase in the numbers of liquor stores complying with the law (ALGC, 2004). Cohen, Mason and Scribner (2002) examined the relationships among alcohol control policies and practices, including regulations related to alcohol accessibility, licensure of outlets, and disciplinary actions, and alcohol-related motor vehicle collision fatality rates in 107 American cities. They observed a significant negative relationship between numbers of alcohol regulations and fatalities. Cities that had 9 or fewer of the 20 regulations considered had a fatality rate 1.46 times higher than cities with 15 or more of the 20 regulations. However, they were not able to identify which specific policies or practices had the strongest effects.

Although regulations can be used to minimize some of the harms associated with increased alcohol availability, strong regulation and enforcement tends to be difficult to sustain. For example, research on regulation and enforcement directed to preventing underage consumption has found temporary, inconsistent or no effects of community enforcement programs (Lewis et al., 1996; Centres for Disease Control and Prevention, 2004; Wagenaar et al., 2000; Willner et al., 2000). Thus, while enhanced regulation and enforcement are key components of alcohol policy, they cannot be relied on to prevent all, or even most, problems.

SUMMARY: Increased regulation and enforcement effects can act to reduce alcohol problems. However, their effects are variable and often not sustained, as enforcement priorities or resources shift.

4. Concluding Comments: Monitoring the Effects of Policy Change

Policy change, such as change in alcohol retailing policies, is a complex process that requires substantial effort to prepare for and implement. It is, therefore, important that a complete assessment of potential impacts be conducted before undertaking policy changes that result in substantial increases in harms and may be difficult to reverse. For example, when the Ontario government lowered the minimum drinking age from 21 to 18 in 1971, it soon became clear that this change in policy was having substantial adverse effects, including significant increases in adolescent drinking driving fatalities and alcohol problems in high schools (Schmidt and Kornaczewski, 1975). There existed no formal mechanism to permit reconsideration of this policy change, although eventually policies were developed to attempt to mitigate these effects (e.g., raising the drinking age to 19, introduction of Graduated Driver Licensing).

In some jurisdictions, alcohol policies have been evaluated under pilot conditions before full implementation. Under these circumstances, policies with adverse effects can be rescinded so that damage can be minimized. For example, an experiment with the sale of strong beer (stronger than 4.7%) in grocery stores in two provinces in Sweden was initiated in November 1, 1967. According to initial plans the experiment should have lasted until December 31, 1968. However, the experiment was ended early (on July 14, 1968) because of reports that the experiment had led to increased alcohol abuse, especially among adolescents (Mäkelä, Rossow and Tryggvesson, 2002). Thus, where the effects of policy change are uncertain, preliminary assessment of the impact of policy change under pilot conditions can provide valuable assistance to government decision-making.

SUMMARY: Any change to alcohol distribution has the potential to increase alcohol consumption and related morbidity and mortality. Larger changes are associated with larger risk for damage. Pilot implementation and evaluation of policy changes provides the important option of identifying and avoiding policy changes that could create more damage than benefits.

5. References

Addiction Research Foundation (1996). Drugs in Ontario. Toronto: Addiction Research Foundation.

Adlaf, E. M., Begin, P. and Sawka, E. (Eds.) (2005). Canadian Addiction Survey (CAS): A National Survey of Canadian's Use of Alcohol and Other Drugs: Prevalence of Use and Related Harms: Detailed Report. Ottawa: Canadian Centre on Substance Abuse.

Adlaf, E. M. and Ialomiteanu, A. (2002). CAMH Monitor eReport: Addiction and Mental Health Indicators among Ontario Adults in 2001, and Changes Since 1977: CAMH Research Document Series No. 12. Toronto: Centre for Addiction and Mental Health.

Adlaf, E.M. and Paglia, A. (2003). Drug Use Among Ontario Students, 1977-2003: Detailed OSDUS Findings. CAMH Research Document Series, No. 13. Toronto: Centre for Addiction and Mental Health.

Adrian, M., Ferguson, B. and Her, M. (2001). Can Alcohol Price Policies Be Used to Reduce Drunk Driving? Evidence from Canada. Substance Use and Misuse, 36 (13), 1923-1957.

Alberta Gaming and Liquor Commission. (2002). Under 25 Initiative. Edmonton: Alberta Gaming and Liquor Commission.

Alberta Gaming and Liquor Commission. (2004). Under 25 Initiative: 2004. Edmonton: Alberta Gaming and Liquor Commission.

Asbridge, M., Mann, R.E., Stoduto, G. and Flam-Zalcman, R. (2004). The Criminalization of Impaired Driving in Canada: Assessing the Deterrent Impact of Canada's First *per se* Law. Journal of Studies on Alcohol, 65, 450-459.

Ashley, M.J., Rehm, J., Bondy, S., Single, E. and Rankin, J. (2000). Beyond Ischemic Heart Disease: Are There Other Health Benefits from Drinking Alcohol? Contemporary Drug Problems, 27, 735-777.

Babor, T., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham,K., Grube, J., Gruenewald, P., Hill, L., Holder, H., Romel, R., Österberg, E., Rehm, J., Room, R. and Rossow, R. (2003). Alcohol, No Ordinary Commodity: Research and Public Policy. Oxford: Oxford University Press.

Bradshaw, P. (2003). Underage Drinking and the Illegal Purchase of Alcohol. Edinburgh: Scottish Executive Social Research.

Bruun, K., Edwards, G., Lumio, M., Mäkelä, K., Popham, R.E., Room, R., Schmidt, W., Skog, O.J., Sulkunen, P. and Österberg, E. (1975). Alcohol Control Policies in Public Health Perspective: The Finnish Foundation for Alcohol Studies, Vol. 25. Helsinki: Finnish Foundation for Alcohol Studies.

Bushman, B. J. (1997). Effects of Alcohol on Human Aggression: Validity of Proposed Mechanisms. In: Galanter, M. (Ed.). Recent Developments in Alcoholism, Vol. 13, Alcohol and Violence, New York: Plenum Press, 227-244.

Centres for Disease Control and Prevention (2004). Enhanced Enforcement of Laws to Prevent Alcohol Sales to Underage Persons. New Hampshire, 1999 – 2004. Morbidity and Mortality Weekly Report, 53, 452-454.

Chaloupka, F.J., Saffer, H. and Grossman, M. (1996). Alcohol-control Policies and Motor-vehicle Fatalities. Journal of Legal Studies 22, 161-186.

Cohen, D.A., Mason, K. and Scribner, R. (2002). The Population Consumption Model, Alcohol Control Practices, and Alcohol-related Traffic Fatalities. Preventive Medicine, 34 (2): 187-97.

Dawson, D.A. (1997). Alcohol, Drugs, Fighting and Suicide Attempt/Ideation. Addiction Research, 5(6):451-472.

Dent, C.W. (2005). Community Level Alcohol Availability and Enforcement of Possession Laws as Predictors of Youthful Drinking. Preventive Medicine, 40, 355-362.Addiction Research, 5 (6): 451-472.

Edwards, G., Anderson, P., Babor, T.F., Casswell, S., Ferrence, R., Giesbrecht, N., Godfrey, C., Holder, H.D., Lemmens, P., Mäkelä, K., Midanik, L.T., Norström, T., Österberg, E., Romelsjö, A.., Room, R., Simpura, J. and Skog, O.J. (1994). Alcohol Policy and the Public Good. Oxford: Oxford University Press.

Escobedo, L.G. and Ortiz, M. (2002). The Relationship Between Liquor Outlet Density and Injury and Violence in New Mexico. Accident Analysis Prevention. 34 (5): 689-94.

Flanagan, G. (2003). Sobering Result: The Alberta Liquor Retailing Industry Ten Years after Privatization. Edmonton: Canadian Centre for Policy Alternatives and Parkland Institute, (June).

Gliksman, L., Demers, A., Adlaf, E.M., Newton-Taylor, B. and Schmidt, K. (2000). Canadian Campus Survey, 1998. Toronto: Centre for Addiction and Mental Health.

Goldstein, A. and Kalant, H. (1990). Drug Policy: Striking the Right Balance. Science, 249, 1513-1521.

Graham, K., Wells, S. and Jelley, J. (2002). The Social Context of Physical Aggression Among Adults. The Journal of Interpersonal Violence, 17, 64-83.

Gruenewald, P.J. and Ponicki, W.R. (1995). The Relationship of the Retail Availability of Alcohol and Alcohol Sales To Alcohol-related Traffic Crashes. Accident Analysis Prevention, 22 (2): 249-59.

Gruenewald, P.J., Millar, A.B., Treno, A.J., Yang, Z., Ponicki, W.R. and Roeper, P. (1996). The Geography of Availability and Driving After Drinking. Addiction, 91 (7): 967-83.

Gruenewald, P.J., Stockwell, T., Beel, A. and Dyskin, E.V. (1999). Beverage Sales and Drinking and Driving: the Role of On-premise Drinking Places. Journal of Studies on Alcohol, 60 (1): 47-53.

Gruenewald, P.J., Johnson, F.W. and Treno, A.J. (2002). Outlets, Drinking and Driving: A Multilevel Analysis of Availability. Journal of Studies on Alcohol. 63 (4): 460-8.

Her, M., Giesbrecht N., Room, R. and Rehm, J. (1998). Implications of Privatizing/Deregulating Alcohol Retail Sales: A Projection of Alcohol Consumption in Ontario. Journal of Substance Abuse 10 (4): 355-373.

Her, M., Giesbrecht, N., Room, R. and Rehm, J. (1999). Privatizing Alcohol Sales and Alcohol Consumption: Evidence and Implications. Addiction 94(8): 1125-1139.

Kelleher, K.J., Pope, S.K., Kirby, R.S. and Rickert, V.I. (1996). Alcohol Availability and Motor Vehicle Fatalities . Journal of Adolescent Health; 19 (5) Nov 96, p.325-30.

Lapham, S.C., Gruenewald, P.J., Remer, L. and Layne, L. (2004). New Mexico's 1998 Drive-up Liquor Window Closure. Study I: Effect on Alcohol-involved Crashes. Addiction, 99 (5): 598-606.

LaScala, E.A., Johnson, F.W. and Gruenewald, P.J. (2001). Neighborhood Characteristics of Alcohol-related Pedestrian Injury Collisions: A Geostatistical Analysis. Prev Sci., 2 (2): 123-34.

Laxer, G., Green, D., Harrington, T. and New, D. (1994). Out of Control: Paying the Price for Privatizing Alberta's Liquor Control Board. Ottawa, Canadian Centre for Policy Alternatives.

Lenke, L. (1990). Alcohol and Criminal Violence: Time Series Analysis in a Comparative Perspective. Stockholm: Almquist and Wiksell International.

Lewis, R.K., Paine-Andrews, A., Fawcett, S.B., Francisco, V.T., Richter, K.P., Copple, B. and Copple, J.E. (1996). Evaluating the effects of a community coalition's efforts to reduce illegal sales of alcohol and tobacco products to minors. Journal of Community Health. Vol. 21, Iss. 6; p. 429-437.

Macdonald, S., Cherpitel, C. J., Borges, G., DeSouza, A., Giesbrecht, N. and Stockwell, T. (2005). The Criteria for Causation of Alcohol in Violent Injuries Based on Emergency Room Data From Six Countries. Addictive Behaviors, 30: 103-113.

Mäkelä, P., Rossow, I. and Tryggvesson, K. (2002). Who Drinks More and Less When Policies Change? The Evidence from 50 Years of Nordic Studies. In: Room, R. (Ed.). The Effects of Nordic Alcohol Policies: What Happens to Drinking and Harm When Alcohol Controls Change? Pg. 17-70. Publication No. 42. Helsinki: Nordic Council for Alcohol and Drug Research, NAD.

Mann, R.E. and Anglin, L.M. (1990). Alcohol Availability, Per Capita Consumption, and the Alcohol-crash Problem. In: Wilson, R.J. and Mann, R.E. (Eds.). Drinking and Driving: Advances in Research and Prevention, New York: Guilford Press, 205-225.

Mann, R.E., Smart, R.G. and Anglin, L.M. (1996). Alcohol Consumption, Enforcement, Treatment, and Alcoholics Anonymous Membership as Factors in Traffic Fatalities. Journal of Studies on Alcohol, 57, 646-651.

Mann. R.E., Macdonald, S., Stoduto, G., Bondy, S., Jonah, B. and Shaikh, A. (2001). The Effects of Introducing or Lowering Legal per se Blood Alcohol Limits For Driving: An International Review. Accident Analysis and Prevention, 33, 569-583.

Mann, R.E., Smart, R.G. and Govoni, R. (2003). The Epidemiology of Alcoholic Liver Disease. Alcohol Research and Health, 27, 209-219.

Mann, R.E., Flam Zalcman, R., Asbridge, M., Suurvali, H. and Giesbrecht, N. (submitted). Drinking Driving Fatalities and Consumption of Beer, Wine and Spirits.

Mann, R.E., Rehm, J.T., Giesbrecht, N., Room, R., Adlaf, E.M., Gmel, G., Graham, K., Österberg, E. and Smart, R. (2005). The Effect of Different Forms of Alcohol Distribution and Retailing on Alcohol Consumption and Problems – An Analysis of Available Research. A Report Prepared for the Beverage Alcohol System Review Panel. Centre for Addiction and Mental Health, 2005.

Mayhew, D.R., Brown, S.W. and Simpson, H.M. (2002). The Alcohol-Crash Problem in Canada: 2000. Ottawa: Traffic Injury Research Foundation.

Meliker, J.R., Maio, R.F., Zimmerman, M.A., Kim, H.M., Smith, S.C. and Wilson, M.L. (2004). Spatial Analysis of Alcohol-related Motor Vehicle Crash Injuries in Southeastern Michigan. Accident Analysis Prevention, 36 (6): 1129-35.

Mulford, A., Ledolter, J. and Fitzgerald, J.L. (1992). Alcohol Availability and Consumption: Iowa Sales Data Revisited. Journal of Studies on Alcohol, 53 (5):487-494.

Noland, R.B. (2003). Traffic Fatalities and Injuries: The Effect of Changes in Infrastructure and Other Trends. Accident Analysis Prevention, 35 (4): 599-611.

Norström, T. (1993). Family Violence and Total Consumption of Alcohol. Nordisk Alkoholtidskrift, 10 (6), 311-318.

Norström, T. (1998). Effects on Criminal Violence of Different Beverage Types and Private and Public Drinking, Addiction, 93, 689-699.

Norström, T. (2001). Per Capita Alcohol Consumption and All-cause Mortality in 14 European Countries. Addiction 96 (Supplement 1): S113-S128.

Norström, T. and Skog, O.J. (2003). Saturday Opening of Alcohol Retail Shops in Sweden: An Impact Analysis. Journal of Studies on Alcohol, 64 (3): 393-401.

Norström, T. (2004). Per Capita Alcohol Consumption and All-cause Mortality in Canada, 1950-98. Addiction, 99: 1274-1278.

Parker, R.N. and Cartmill, R.S. (1998). Alcohol and Homicide in the United States 1934-1995 – Or One Reason Why U.S. Rates of Violence May Be Going Down. Journal of Criminal Law and Criminology, 88 (4), 1369-1398.

Pernanen, K., Cousineau, M.M., Brochu, S. and Sun, F. (2002). Proportions of Crimes Associated with Alcohol and Other Drugs in Canada. Ottawa: Canadian Centre on Substance Abuse.

Ramstedt, M. (2002). Alcohol-related Mortality in 15 European Countries in the Postwar Period. In: Norström, T. (Ed.). Alcohol in Postwar Europe. Consumption, Drinking Patterns, Consequences and Policy Responses in 15 European countries. Stockholm: Almqvist and Wiksell International, 137-156.

Ramstedt, M. (2003). Alcohol Consumption and Liver Cirrhosis Mortality With and Without the Mention of Alcohol – the Case of Canada. Addiction 98: 1267-1276.

Ramstedt, M. (2004a). Alcohol and Pancreatitis Mortality at the Population Level: Experiences from 14 Western Countries. Addiction 99,1255-1261.

Ramstedt, M. (2004b). Alcohol Consumption and Alcohol-related Mortality in Canada, 1950-2000.Canadian Journal of Public Health 95 (2): 121-126.

Ramstedt, M. (in press). Alcohol and Suicide at the Population Level – The Canadian Experience. Drug and Alcohol Review.

Rehm, J. and Sempos, C.T. (1995a). Alcohol Consumption and All-cause Mortality. Addiction, 90, 471-480.

Rehm, J. and Sempos, C.T. (1995b). Alcohol Consumption and Mortality - Questions about Causality, Confounding and Methodology. Addiction, 90, 493-498.

Rehm, J. and Gmel, G. (2001). Aggregate Time-series Regression in the Field of Alcohol. Addiction, 96(7): 945-954.

Rehm, J., Room, R., Graham, K., Monteiro, M., Gmel, G., and Sempos,C.T. (2003). The Relationship of Average Volume of Alcohol Consumption and Patterns of Drinking to Burden of Disease - An Overview. Addiction, 98 (10), 1209-1228.

Rehm, J., Room, R., Monteiro, M., Graham, K., Rehn, N., Sempos, C.T. and Jernigan, D. (2003a). Alcohol as a Risk Factor for the Global Burden of Disease. European Addiction Research 9: 157-164.

Rehm, J., Room, R., Graham, K., Monteiro, M., Gmel, G. and Sempos, C.T. (2003b). The Relationship between Average Volume of Alcohol Consumption and Patterns of Drinking to Burden of Disease – An Overview. Addiction 98: 1209-1228.

Rehm, J. (2005). Proposed Changes in Alcohol Retailing in Ontario: An Estimate of Social and Health Costs of Several Scenarios. Presentation at the Ontario Public Health Association Meeting on "Alcohol – No Ordinary Commodity II", Toronto, Canada. March 11, 2005.

Romanus, G. (1992). The Role of the State Alcohol Monopoly, and its Relationship to Other Government Bodies. In: Ferris, J., Dunning, R., Giesbrecht, N. and West, P. (Eds.). International Symposium on Alcohol Monopolies and Social and Health Issues (pp. 187-193). Proceedings of a Symposium, Toronto, October 27-30, 1992. Toronto: Addiction Research Foundation and the Liquor Control Board of Ontario.

Room, R. (1993). The Evolution of Alcohol Monopolies and their Relevance for Public Health. Contemporary Drug Problems 20:169-187.

Room, R. and Rossow, I. (2001). The Share of Violence Attributable to Drinking. Journal of Substance Use, 6: 218-228.

Room, R. (2003). Effects Of Alcohol Controls: Lessons from a Half-century of Nordic Social Experimentation. Presented at an International Research Symposium "Preventing Substance Use, Risky Use and Harm: What is Evidence-based Policy?' Fremantle, Western Australia, 24-27 February 2003.

Room, R. (2004). Effects of Alcohol Controls: Nordic Research Traditions. Drug and Alcohol Review 23: 43-53.

Room, R., Babor, T. and Rehm, J. (2005). Alcohol and Public Health. Lancet Vol. 365 (Feb. 5): 519-530.

Rossow, I. (2000). Suicide, Violence and Child Abuse: Review of the Impact of Alcohol Consumption on Social Problems. Contemporary Drug Problems, 27: 397-434.

Rossow, I. (2001). Alcohol and Homicide – A Cross-cultural Comparison of the Relationship in 14 European Countries. Addiction, 96 (Supplement 1): S77-S92.

Rossow, I., Pernanen, K. and Rehm, J. (2001). Alcohol, Suicide and Violence. In: Klingemann, H. and Gmel, G. (Eds.). Mapping the Social Consequences of Alcohol Consumption (pp. 93-112). Dordrecht: Kluwer Academic Publishers.

Rossow, I. (2004). Alcohol Consumption and Homicides in Canada 1950-1999. Contemporary Drug Problems 31, 541-560.

Saunders, J.B., Aasland, O.G., Babor, T.F., De la Fuente, J.R. and Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption. Addiction, 88, 791-804.

Schmidt, W. and Kornaczewski, A. (1975). The Effect of Lowering the Legal Drinking Age in Ontario on Alcohol-related Motor Vehicle Accidents. Proc. 6. Internat. Conference on Alcohol Drugs and Traffic Safety, Addiction Research Foundation, Toronto, 1975.

Scribner, R.A., MacKinnon, D.P. and Dwyer, J.H. (1994). Alcohol Outlet Density and Motor Vehicle Crashes in Los Angeles County Cities. Journal of Studies on Alcohol. 55 (4), 447-53.

Seeley, J. R. (1960). Death by Liver Cirrhosis and the Price of Beverage Alcohol. Canadian Medical Association Journal, 83, 1361-1366.

Single, E., Giesbrecht, N. and Eakins, B. (1981). The Alcohol Policy Debate in Ontario in the Post-war Era. In: Single, E., Morgan, P. and de Lint, J. (Eds.). Alcohol, Society, and the State. 2. The Social History of Control Policy in Seven Countries. Toronto: Addiction Research Foundation, 127-157.

Single, E., Robson, L., Xie, X. and Rehm, J. (1998). The Economic Costs of Alcohol, Tobacco and Illicit Drugs in Canada, 1992. Addiction, 93, 991-1006.
Skog, O.J. (2001). Alcohol Consumption and Mortality Rates from Traffic Accidents, Accidental Falls, and Other Accidents in 14 European Countries. Addiction, 96 (1): 49-58.
Skog, O.J. (2003). Alcohol Consumption and Fatal Accidents in Canada, 1950-98. Addiction, 98 (7): 883-93.
Smart, R.G., Adlaf, E.M. and Walsh, G.W. (1996). Procurement of Alcohol and Underage Drinking among Adolescents in Ontario. Journal of Studies on Alcohol, 57(4):419-424.
Smart, R.G. and Ogborne, A.C. (1997). Northern Spirits. A Social History of Alcohol in Canada. Toronto: Addiction Research Foundation, 1997.
Treno, A.J., Grube, J.W. and Martin, S.E. (2003). Alcohol Availability as a Predictor of Youth Drinking and Driving: A Hierarchical Analysis of Survey and Archival Data. Alcohol, Clinical Experimental Research. 27 (5): 835-40.
Trolldal, B. (2005). The Privatization of Wine Sales in Quebec in 1978 and 1983-84. Alcohol Clin Exp Res. 2005 Mar;29(3):410-6.
Trolldal, B. (in press a). An Investigation of the Effects of Privatization of Retail Sales of Alcohol on Consumption and Traffic Accidents in Alberta, Canada. Addiction.
Wagenaar, A.C. and Holder, H.D. (1991). Change from Public to Private Sale of Wine: Results from Natural Experiments in Iowa and West Virginia. Journal of Studies on Alcohol, 52 (2):162-173.
Wagenaar, A.C. and Holder, H.D. (1995). Changes in Alcohol Consumption Resulting from the Elimination of Retail Wine Monopolies: Results from Five U.S. states. Journal of Studies on Alcohol, 56 (5): 566-572.
Wagenaar, A.C., Murray, D.M., Gehan, J.P., Wolfson, M., Forster, J.L., Toomey, T.L., Perry, C.L. and Jones-Webb, R. (2000). Communities Mobilizing Change on Alcohol: Outcomes from a Randomized Community Trial. Journal of Studies on Alcohol, 85-94.
Weitzman, E.R., Folkman, A., Folkman, K.L. and Wechsler, H. (2003). Relationship of Alcohol Outlet Density to Heavy and Frequent Drinking and Drinking-related Problems among College Students at Eight Universities. Health and Place, 9 (1): 1-6.
Wells, S. and Graham, K. (2003). Aggression involving alcohol: Relationship to drinking patterns and social context, Addiction, 98(1), 33-42.
Wells, S., Graham, K. and West, P. (2000). Alcohol-related Aggression in the General Population. Journal of Studies on Alcohol, 61, 626-632.
West, D. (2003). The Privatization of Liquor Retailing in Alberta. The Fraser Institute: Vancouver.
Willner P., Hart K., Binmore J., Cavendish M. and Dunphy E. (2000). Alcohol Sales to Underage Adolescents: An Unobtrusive Observational Field Study and Evaluation of a Police Intervention. Addiction, 95, 1373-1388.
Willner, P. and Hart, K. (2001). Adolescents' Reports of Their Illicit Alcohol Purchases. Drugs: Education, Prevention and Policy, 3, 233-241.
Wilson, R.J. and Mann, R.E. (1990). Drinking and Driving: Advances in Research and Prevention, Guilford Press, New York.
World Health Organization (2002). World Health Report: Reducing Risks, Promoting Healthy Life. Geneva: World Health Organization.

Xie, X., Rehm, J., Single, E. and Robson, L. (1996). The Economic Costs of Alcohol, Tobacco and Illicit Drug Abuse in Ontario: 1992. Toronto: Addiction Research Foundation.

Xie, X., Mann, R.E. and Smart, R.G. (2000). The Direct and Indirect Relationships between Alcohol Prevention Measures and Alcoholic Liver Cirrhosis Mortality. Journal of Studies on Alcohol, 61, 499-506.

Zlatoper, T.J. (1991). Determinants of Motor Vehicle Deaths in the United States: A Cross-sectional Analysis. Accident Analysis Prevention, 23 (5):431-6.

Table 1: Numbers of deaths and days in public hospitals in Ontario resulting from alcohol use, 1992 (Source: Xie et al., 1996)

Disease	*ICD-9 code*	*Days in public hospitals*	*Number of deaths*
Lip and oropharangyeal cancer	140-1, 143-6, 148-9, 230.0	5984	78
Oesophageal cancer	150, 230.1	5915	159
Liver cancer	155-230.8	2160	80
Laryngeal cancer	161, 231.0	4859	64
Breast cancer	174, 233.0	3044	71
Alcoholic psychoses	291	44,157	23
Alcohol dependence syndrome	303	49,722	211
Alcohol abuse	305.0	3296	34
Epilepsy	345	3904	13
Alcoholic polyneuropathy	357.5	348	Na
Hypertension	401-5	1272	11
Alcoholic cardiomyopathy	425.5	761	24
Cardiac dysrhythmias	427.0, 427.2, 427.3	9473	36
Heart failure and related ill-defined conditions	428-9	3072	4
Stroke	430-5	18,050	63
Oesophageal varices	456.0-456.2	1376	2
Gastroesophagel laceration-hemorrhage syndrome	530.7	459	1
Alcoholic gastritis	535.3	2126	9
Alcoholic liver cirrhosis	571.0-571.3	31,231	436
Pancreatitis (acute)	577.0	7660	18
Pancreatitis (chronic)	577.1	7911	8
Spontaneous abortion	634	169	-
Poor fetal growth	656.5	0	-
Psoriasis	696.1	1669	-
Noxious influences, plac/milk	760.7	28	-
Excess blood alcohol	790.3	1	-
Alcohol toxicity	980.0, 980.1	497	-
Motor vehicle traffic accidents	E810-E820, E820-E825	37,732	468
Other road vehicle accidents	E826, E829	905	1
Water transport accidents	E830-E839	220	12
Air-space transport accidents	E840-E845	89	2
Accidental alcohol poisoning	E860.0-E860.2	-	21
Accidental falls	E880-E888	65,673	169
Accidents by fire and flames	E890-E899	376	38
Accidental excessive cold	E901	721	4
Accidental drowning	E910	228	18
Obstruction of respiratory tract with vomit/food	E911	906	16
Accidents with objects/machines	E917-E920	1554	3
Accidents with firearm missile	E922	142	3
Suicide, self-inflicted injury	E950-E959	12,252	244
Victim, assault	E960-E966, E968-E969	4925	49
Victim, child battering	E967	164	0
Total		335,031	2392

Note: Na - Not available

Table 2: Recent Canadian studies of trends in alcohol availability, consumption and damage

Topic	Jurisdiction & Period	Key Variables	Findings	Imp!'cations	Source
Alcohol-related mortality	Canada, Provinces & Territories, 1950-2000	Alcohol sales rate Nine different alcohol-related causes of death5	Trends in alcohol-related mortality tended to follow trends in alcohol consumption, and regions with higher drinking levels also had higher mortality rates.	Given the close relationship between alcohol consumption and alcohol-related mortality, these measures are important as markers of alcohol-related harm in Canada	Ramstedt, 2004b
Liver cirrhosis mortality	Canada & Provinces, 1950-1998	Alcohol sales rate Liver cirrhosis deaths by province for men and women, by age	Statistically significant associations found between total cirrhosis, both males and females, and trends in consumption for all provinces. Per capita consumption is closely related to death rates from liver cirrhosis. The magnitude of this association is similar across the Canadian provinces and both male and female cirrhosis increased with a rise in the overall level of drinking.	A one litre increase in per capita consumption is expected to increase total male liver cirrhosis mortality by 17%	Ramstedt, 2003
Liver cirrhosis mortality	Canadian Provinces, 1968-1986	Alcohol outlet rate, alcohol price, alcohol sales rate, liver cirrhosis death rate	Statistically significant associations between alcohol price, alcohol outlets and alcohol consumption such that increases in outlets and decreases in price increased consumption. Also significant associations between alcohol consumption and liver cirrhosis mortality, such that increase in consumption increased significantly cirrhosis mortality rates.	A 10% increase in price tended to reduce consumption levels by 1%, and a 10% increase in rate of alcohol outlets tended to increase consumption levels by 1.9%. A 1% increase in average consumption tended to increase the average person's chances of dying from alcohol-related cirrhosis by 3.4%	Xie, Mann and Smart, 2000
Pancrea-titis mortality	Canada, 1950-1995	Alcohol sales rate Age-adjusted mortality, by gender	No significant effect of consumption on pancreatitis mortality with five-year lagging; marginally significant effect for males without lagging	A one-litre increase in consumption might bring a 5% increase in pancreatitis mortality, but the result is not statistically significant.	Ramstedt, 2004a

5 Liver cirrhosis, alcoholic diseases of the liver, alcoholism/alcohol dependence syndrome, alcoholic psychosis, alcohol poisoning, alcohol abuse, alcoholic cardiomyopathy, alcoholic gastritis, alcoholic polyneuropathy.

Ischaemic heart disease (IHD) Mortality	Canada, 1950-1998	Alcohol sales rate; IHD-mortality rate; Cigarette smoking, unemployment and female IHD-mortality as controls.,	Higher overall alcohol consumption was related to higher male IHD mortality. This effect was most related to spirits consumption, whereas beer and wine did not show any significant relation with population level mortality.	One litre change in per capita consumption was followed by an increase in IHD mortality among adult males of about 2%. The idea that alcohol saves more IHD deaths than it causes in Canada, is not in accordance with these findings	Ramstedt, submitted for publication
Fatal accidents	Canada & Provinces, 1950-1998	Alcohol sales rate Accidental deaths (including external causes of injury & poisoning; excluding suicide & homicide) by gender & age	Statistically significant associations were found between alcohol consumption and overall fatal accident rates in all provinces for males, and all provinces except Ontario for females.	For Canada, an increase in per capita alcohol consumption of 1 litre was accompanied by an increase in accident mortality of 5.9 among males and 1.9 among females per 100,000 inhabitants	Skog, 2003
Drinking driver fatalities	Ontario, 1962-1996	Alcohol sales rate, drinking driver deaths, Introduction of Canada's legal limit law and MADD Canada	Statistically significant associations were found between alcohol consumption and drinking driver death rate	A one litre increase in average alcohol consumption increased the drinking driver death rate between 8 and 14%	Asbridge et al, 2004
Drinking driver fatalities	Ontario, 1962-1996	Alcohol sales rate by beverage (beer, wine and spirits), drinking driver deaths	Statistically significant associations were found between total alcohol consumption, and total beer consumption, and drinking driver death rate.	A one litre increase in average alcohol consumption in the form of beer increased the drinking driver fatality rate by 23%	Mann et al, submitted
Homicides	Canada & Provinces, 1950-1999	Alcohol sales rate Homicides by gender	Trends in alcohol sales and homicide appear to follow a similar pattern. Positive and statistically significant association found for Ontario and Alberta between these variables, and a borderline significant association for BC. Pooled estimates from the individual provinces produced a statistically significant association.	For example, in Ontario a 1-liter increase in alcohol sales per capita is accompanied by an increase of 0.23 homicides per 100,000 inhabitants.	Rossow, 2004
Suicide	Canada & Provinces, 1950-1998	Alcohol sales rate, unemployment rate, and Suicide rate by gender	Changes in overall alcohol consumption were associated with variations in the suicide rate in most parts of Canada during the postwar period (19950-1998). Tendency of the female suicide rate to more sensitive to variations in overall consumption. Also estimated that	Total suicides in Canada increased significantly by around 4% as alcohol consumption increased 1 litre per capita	Ramstedt, in press

			25-30% of suicides in Canada are related to alcohol.		
Total Mortality	Canada, 1950-1998	Alcohol sales rate; Age-standardized mortality, by gender Cigarette sales	Significant alcohol effect on total mortality, which was reduced, but still statistically significant, when cigarette sales were included in the model.	Given a 1-litre increase in consumption one might expect an increase of 1.7% to 2.9% in total mortality	Norström, 2004

Table 3: Estimated alcohol-attributable mortality in Canada (2001): Different alcohol consumption scenarios after change in outlet rates

Disease	Estimates for 2001	Plus 10%	Plus 20%
Malignant neoplasm	2483	2537	2577
Diabetes	-258	-274	-292
Neuro-Psychiatric conditions	819	895	971
Cardio Vascular disease	-2665	-2571	-2458
Digestive disease (mainly liver cirrhosis)	1271	1320	1361
Skin disease	2	2	2
Conditions during peri-natal	15	15	15
Unintentional Injuries			
Motor vehicle accidents	936	1075	1214
Other unintentional injuries	1396	1541	1686
Intentional Injuries			
Suicides/ self-inflicted injuries	619	676	732
Homicides	168	189	210
Other intentional injuries	27	29	32
Total deaths	**4813**	**5434**	**6050**

Note: negative numbers indicate protective effects of alcohol consumption.

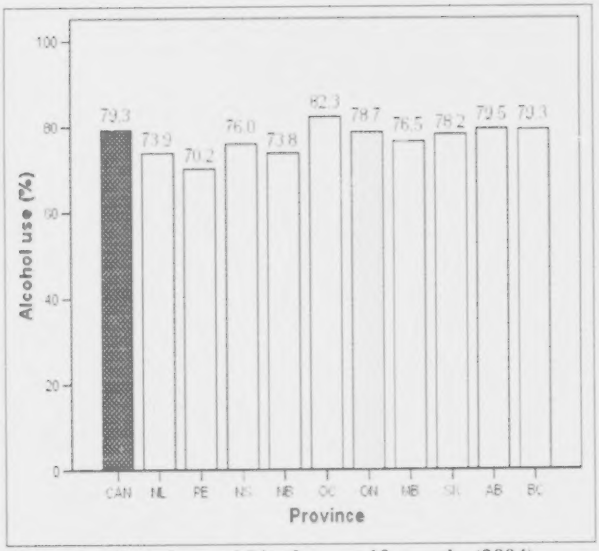

Figure 1: Alcohol use within the past 12 months (2004) in Canada by province (Source: Canadian Centre on Substance Abuse, 2004)

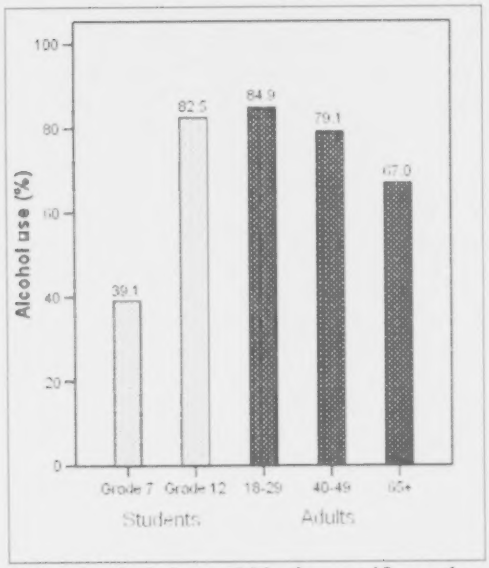

Figure 2: Alcohol use within the past 12 months among students (2003) and adults (2001) in Ontario by selected grade or age group (Sources: Adlaf and Paglia, 2003 (students); Adlaf and Ilomiteanu, 2002 (adults)

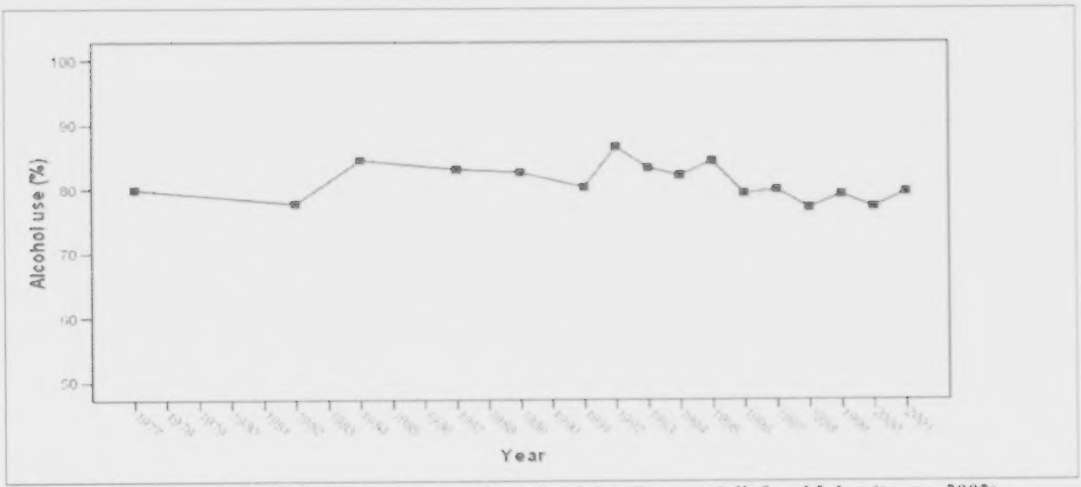

Figure 3: Trend over time in alcohol use among Ontario adults (Source: Adlaf and Ialomiteanu, 2002)

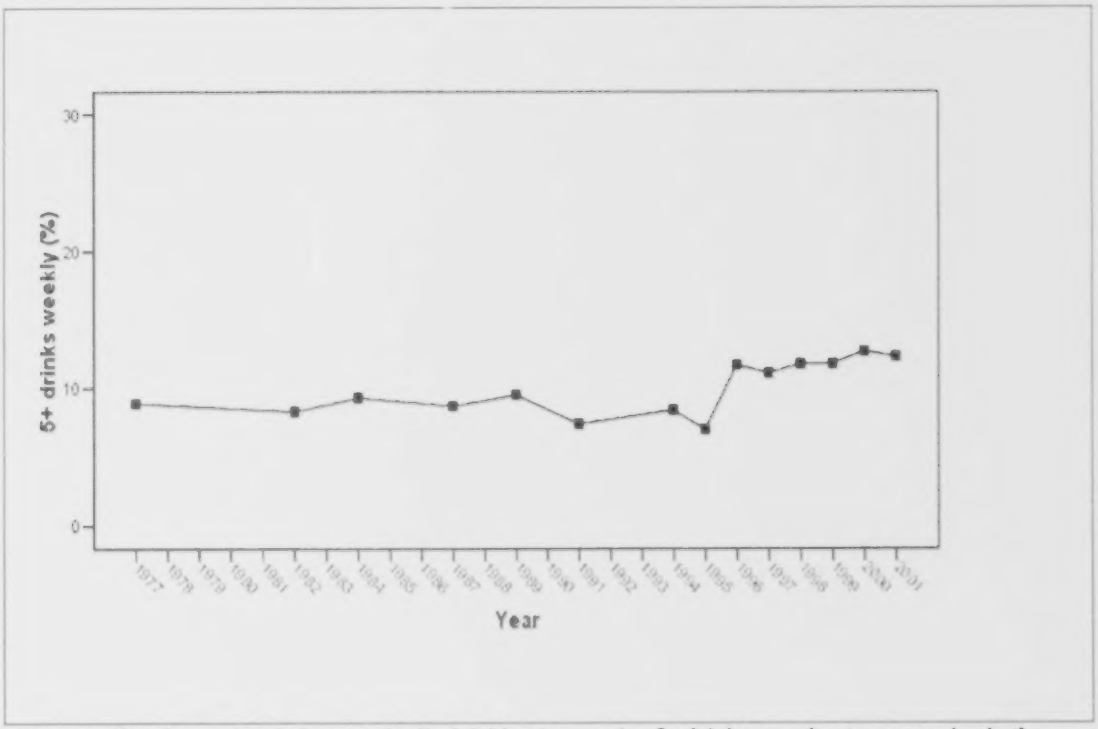

Figure 4: Trend over time in heavy episodic drinking (consuming 5+ drinks on at least one occasion in the past week) among Ontario adults (Source: Adlaf and Ialomiteanu, 2002)

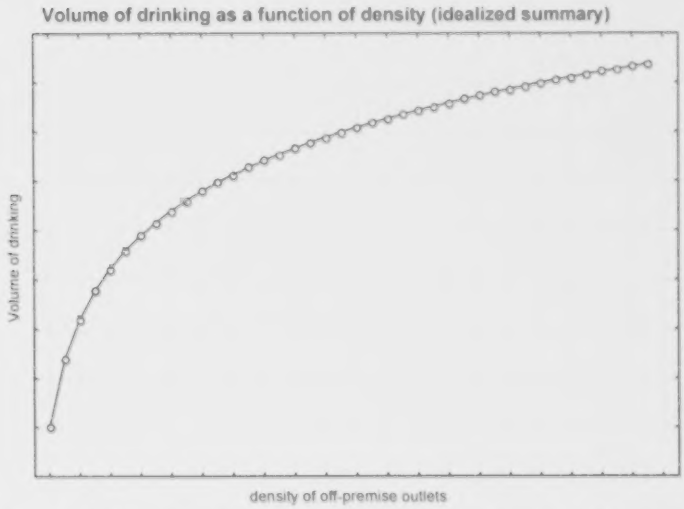

Figure 5: Illustration of the relationship between volume of drinking as a function of outlet density (Source: Her et al., 1999a)